SECTION 26 32 13

STANDBY POWER SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. This section details general requirements for equipment used for Emergency and Standby power systems, including engine generators, automatic transfer switches and related accessory equipment.

1.2 RELATED SECTIONS

B. Section 01301- Design Guidelines for Energy and Environment
C. Section 01701 - Building Systems Identification and Labeling
D. Section 01771 - Contract Record Documents
E. Section 260901 – Campus Central Metering System Design Criteria

1.3 QUALITY ASSURANCE

A. The Engineer of Record is responsible for designing a system in accordance with applicable portions of the NFPA Codes, Rhode Island Emissions Standards, NFPA, UL and NEMA Standards.

B. Emergency and Standby Power system design shall be in accordance with NFPA 110.

C. Electrical components, devices, and accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.4 EMERGENCY GENERATOR DESIGN CRITERIA:

A. Where engine generators are installed for powering of Standby power loads, they shall be configured to power the following:
   1. All Emergency /Life Safety loads
   2. Building Automation System controls
   3. Building telecommunications rooms
   4. Identified standby power loads (for example, local boiler and one hot water circulating pump set to reduce the chance of building freeze-up upon an extended power outage).
   5. Storm water sump pumps and sewage ejector pumps
   6. Identified User loads (computer systems, lab equipment, etc.)

B. Exercise care in the configuration and sizing of standby power loads to minimize generator size. Generators shall be sized for the full load and starting needs of all connected Emergency Life Safety and legally required Standby loads; provide

generator capacity for lower-priority Optional Standby loads only where the required legally required and optional Standby load exceeds the Emergency capacity. For example, where there are Optional standby loads and an electric fire pump, provide load-shed controls to lock out the Optional standby loads when the fire pump is called to run on the generator; size the generator for only the fire pump load, assuming the fire pump load is larger than the standby power load.

C. The standby power system shall be designed to accommodate the type of loads placed on the system (i.e., motors, UPS, HID lighting, etc.).

D. Review NEC requirements for isolation and bonding requirements of neutral and ground connections at generators and automatic transfer switches.

E. Preference is for generators to be located indoors.

F. Any noise issues shall be closely coordinated with the University. All systems shall be designed to comply with city noise ordinances.
   1. Generators shall have critical-grade silencers.
   2. Exterior-mounted generator enclosures, if required, shall be premium- sound attenuated.
   3. Remote-mounted radiators shall be low-noise, sound attenuated where required.
   4. Noise considerations to include generator air intake and exhaust louvers.

G. Generator Fuel Source: Provide Life Cycle cost analysis for generator fuel type where so directed, based on generator size and availability of natural gas supply. Natural gas is the preferred fuel source in locations where it is readily available at the required minimum gas pressure. Diesel fuel is generally more economical in larger (over 150 KW) sizes. Considerations for diesel fuel include: locations for fuel storage capacity, required secondary spill containment and leak detection for storage tanks, piping and fuel filling systems.

H. Fuel Capacity: Where diesel generators are utilized, provide onsite fuel storage for a minimum of 36 hours run time at 75% load.

I. Fuel Handling:
   1. Fuel filling station shall have spill containment and be provided with spill absorption kit.
   2. Fuel storage tanks and piping shall be of double wall construction. Provide leak detection system for underground fuel storage tanks and piping systems. Leak detection system to be connected to Building Automation Systems for alarms.
   3. Remote located tanks (indoor or underground) to have local fuel tank level indicator and high level alarm monitor at the fuel filling location.

J. Generator Supervisory Monitoring:
   1. Generators “run” status alarms to be connected to building fire alarm for supervisory monitoring.
   2. Provide remote generator alarm annunciator panel, per NFPA 110, adjacent to

fire alarm panel.

3. Provide remote generator shut-down switch, under a break-glass cover, outside the generator room per NFPA 110.

K. Generator Controls:

1. Generators over 100 KW to be provided with electronic generator controls; provide MODBUS communications protocol and data connections for integration of generator operating parameters (“run”/”pre-alarm”/”alarm” status, “Volts”/”KW”/”KVA” load data and fuel tank level) into campus metering system. See section 260901 – CAMPUS CENTRAL METERING SYSTEM DESIGN CRITERIA for details.
2. Generators under 100 KW may be provided with either hard-wired “run”/”alarm”/”pre-alarm” and “low fuel level” dry contacts or MODBUS communications protocol data connections for connection into the Campus Metering System.

L. Remote Radiators:

1. Installations incorporating remote-mounted radiators for cooling to be coordinated and designed per manufacturer requirements, including design and sizing of secondary heat exchangers, coolant circulating pumps, expansion tanks, glycol feeders, consideration of coolant head pressure, supervisory controls and alarm monitoring points.
2. Preferred remote radiator configuration is vertical discharge.

M. Vibration Isolation:

1. Provide vibration isolation dampeners on generator mounting connection points.

2. Provide vibration dampeners on all prepackaged generator enclosure connection points, where mounted on or within buildings.

N. Signage:

3. Provide signage at building service equipment detailing location of generator and service disconnects..

1.5 AUTOMATIC TRANSFER SWITCHES:

A. Provide separate UL-1008 listed transfer switches for emergency life safety, legally required standby and optional standby loads.

B. Transfer switches shall be closed-transition type.

C. Ratings: Transfer switches shall have sufficient short circuit ratings for use on the proposed distribution system; note that many smaller switch sizes have reduced interrupting ratings.

D. Provide transfer switches with integral power meter (volts/amps/Kw); with MODBUS communications protocol; connect meter outputs and transfer switch position contacts into campus metering system.

E. Provide transfer switches with panel-mounted local “load/no-load” test switches; provide remote dry contact closure for remote transfer switch enable operation (start generator and transfer load to generator until contact is opened), Connect contact to campus metering system interface.

PART 2 PRODUCTS:

2.1 GENERATORS

A. Manufacturers:
1. Caterpillar
2. Cummins/Onan

B. Generators shall be 1,800 RPM, continuous standby rated.

2.2 AUTOMATIC TRANSFER SWITCHES:

A. Manufacturers:
1. ASCO 7000 series
2. RussElectric RMTD -series

PART 3 EXECUTION:

3.1 ELECTRICAL DEVICE COORDINATION

A. Ensure that standby power system electrical overcurrent and protective devices are properly calibrated and set, including settings for all transfer switch functions.

B. Provide hardcopy of all transfer switch settings within the transfer switch cabinets.

3.2 FIELD TESTING:

A. Field test the complete sequence of standby power system operation, including power failure, load shed (if applicable) and operation of all supervisory signals and controls. The Engineer of Record shall determine the particular field acceptance testing requirements for each project in coordination with FM Operations and Engineering staff.

B. Field testing of the generator shall include a full load test for a minimum 4-hour period with temporary resistive load banks and installation acceptance tests as required by NFPA 110, including cold start and load acceptance tests.

C. Field test to ensure that generator room is within required tolerances for overheating, airflow, and that exhaust system is free of leaks and restrictions.

D. Ensure that any generator automatic exerciser features within transfer switches, generator control panels or fire pump control panels are disabled “off”.

E. Standby power systems and equipment shall be commissioned to verify proper setup, calibration and recording of standby power system data into the Campus Metering system and remote system operation from Campus Metering system..

END OF SECTION